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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANT: Michael J. Stevenson

SER. NO. 09/862,542

FILED: May 22, 2001

TITLE: GRAPHICS TRANSFER FOR USE IN ROTATIONAL MOLDING

UNIT: 1268

ATTORNEY: Victor S. Chang

DECLARATION BY ALAN REEVES

I, R. Alan Reeves, declare and say as follows:

The following statements are made of my own knowledge and belief, and if called to testify, I could competently testify to the following:

I am a coapplicant of the above identified application and a coinventor of the subject matter described and claimed therein. The invention comprises a two-stage transfer which is applied to the hot (about 150 degrees F.), inside surface of a rotational mold during a molding cycle to produce a polyolefin part. The transfer has a carrier sheet which is coated with a release layer which is adhesive at ambient temperatures, an indicia layer and a heat sensitive adhesive layer which transferred to the interior surface of the mold. When the transfer is applied to the hot mold surface, the release layer becomes non-adhesive to release the transfer. The heat sensitive adhesive layer is non-adhesive at ambient temperature but become adhesive when applied to the hot mold surface. Both the indicia layer and the heat sensitive layer must melt at the molding temperature (about 500 degrees F.) and fuse into the wall of the polyolefin part..

I am familiar with U.S. Patent 5,908,694 to Makar et al and I have recently performed comparative experiments that demonstrate that the use of transfers prepared with the adhesive, lacquer and indicia layers described in that patent can not be used in rotational molding and that the layers do not fuse into the surface of a molded polyolefin part.

In the experiments I prepared a transfer portion by coating successive layers on a carrier film which was pre-coated with a wax release layer. The first of the transfer portion layers that I applied was a lacquer layer formulated as the "most preferred lacquer composition" described in the table in column 7, lines 25-32 of the Makar et al patent. I formulated the lacquer to be suitable for spray application, sprayed the lacquer as a layer on the carrier film, then dried the layer. After the lacquer layer had dried, I printed an acrylic ink layer over the lacquer layer as described in the Makar et al patent in column 5, lines 32-33. The acrylic ink I used was formulated with 89 percent of a colorless acrylic ink base (Cerdec medium No. 80661) with 11 percent carbon black pigment dissolved in toluene to provide a sprayable composition. I sprayed the ink layer over the dried lacquer layer, and dried the ink layer. I then prepared the adhesive composition described in the table in column 9 of the Makar et al patent as a sprayable composition, which I sprayed over the dried ink layer of the transfer. I dried the adhesive layer and then applied the transfer to a rotational mold in the manner described below..

I prepared a second transfer in accordance with the invention described and claimed in this application, using a carrier sheet coated with the same release layer as used in preparing the Makar et al transfer. I coated the carrier sheet with a transfer portion by coating the sheet with an a layer of 11 percent carbon black and 89 percent microcrystalline wax. I then applied a heat sensitive coating formed of an adhesive which is non-adhesive at ambient temperature but adhesive at elevated temperatures, using a composition of a hydrocarbon resin in a hydrocarbon solvent.

The rotational mold which I used in the experiments is a two-piece, cast aluminum mold, approximately 8 inches by 12 inches with a cavity that is 5/8 inch deep. The mold is one that I have used for experiments in my laboratory to test the suitability of transfers for use in rotational molding. Figure 1, shown below, is a photograph of one of the halves of the rotational mold.

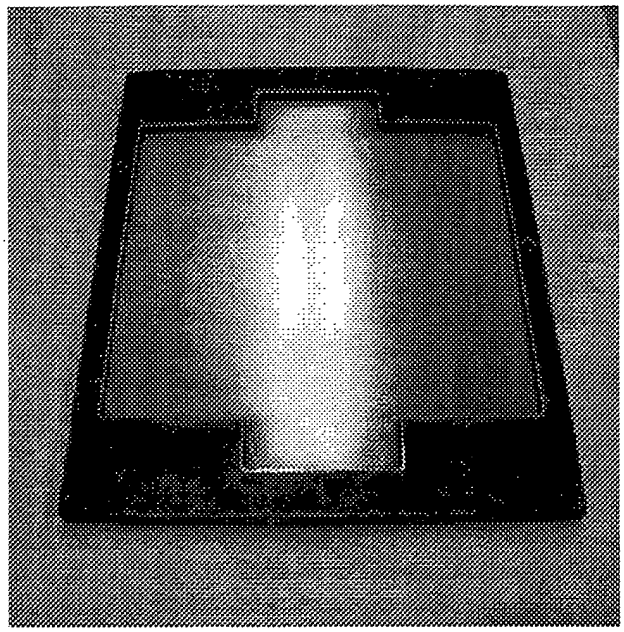
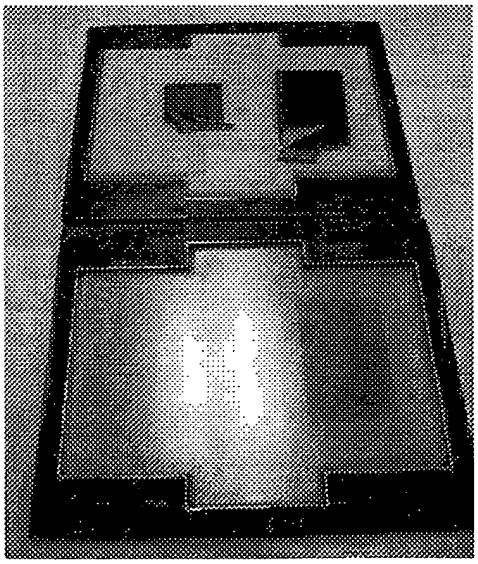


FIGURE 1: **One half of the rotational mold**

The mold forms a hollow-form, narrow box, approximately 12 inches long and 8 inches wide with a thickness of about 5/8 inch.

Both transfers were applied to separate portions of the inside surface of the rotational mold which I had heated to 150 degrees F., which is a typical demolding temperature experienced in rotational molding. I added molding resin (35 mesh linear low density polyethylene) to the mold and closed the two mold halves together and placed them on a rotational molding machine where the mold was heated to 554 degrees F. while rotating about its major and minor axes for 12 minutes. I then cooled the mold, opened the mold and inspected the molded part. Figure 2 is a photograph of the opened mold, with the molded polyethylene part in the mold half in the background of the photograph and the half mold against which the transfers were placed shown in the foreground of the photograph.



The Makar et al transfer did not melt in the mold and left a black residue on the surface of the mold half shown in the foreground. The transfer prepared in accordance with this invention had been applied to the same mold half shown in the foreground, to the left of the Makar et al transfer. The transfer of the invention separated cleanly from the mold half, leaving no visible residue, as apparent from the photograph.

FIGURE 2: Opened rotational mold

I removed the molded polyethylene part from the mold and inspected the surface that was formed against the transfers in the rotational mold. That surface is shown in the photograph which appears as Figure 3.

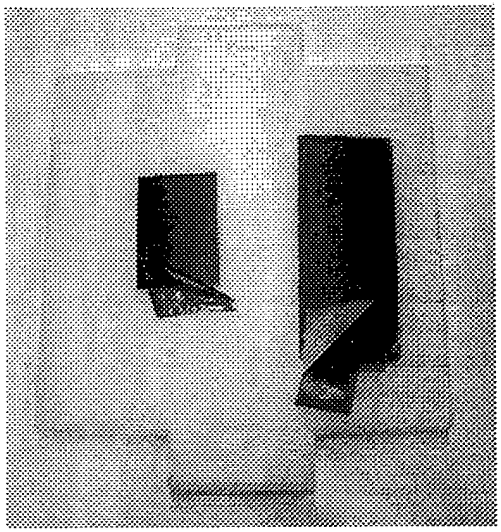


FIGURE 3: Molded Part

Some of the Makar et al transfer separated in the mold and the separated portion appeared on the polyethylene part as a grainy black layer which was not molded into the polyethylene part, but remained as a raised layer on the part. To test the permanency of the transfers to the polyethylene part, I applied a pressure sensitive tape (shown as the red tape at the lower end of each of the transfers) over a portion of each transfer and then peeled back the tape. The tape separated from the transfer which had been prepared in accordance with this invention, while the tape that had been applied over the portion of the Makar et al transfer lifted the transfer under the tape off the polyethylene part.

The appearance of the Makar et al transfer is shown in greater detail in the photograph that appears as Figure 4 which shows that the edges of the transfer were uneven and grainy. The transfer also was an apparent applique on the surface of the polyethylene part as it was raised above the surface of the surrounding polyethylene surface. In contrast, the transfer prepared in accordance with this invention shown in Figure 5 was entirely fused into the surface of the polyethylene part with a smooth polished surface that was flush with the surrounding polyethylene surface.

FIGURE 4: Makar et al Transfer

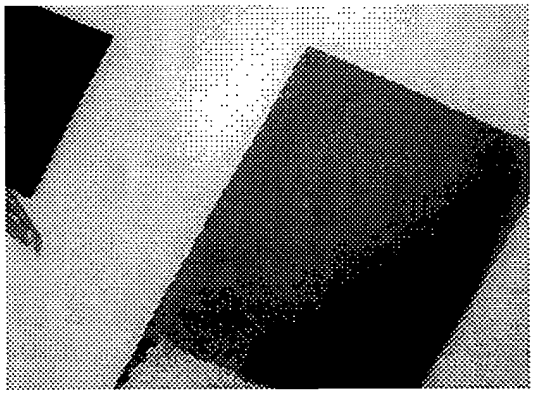
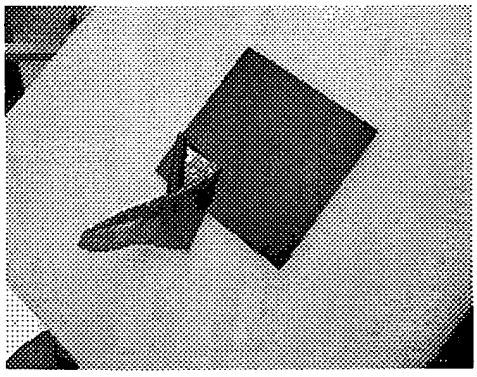


FIGURE 5: Invention Transfer



I declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable be fine or imprisonment, or both, under Section 1001 of Title of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent resulting therefrom.

Declared at Clarkdale, Arizona this 28th day of January, 2004.

R. Alan Reeves

R. Alan Reeves